



## Letter to the Editor

## Letter to the Editor: The effect of ECT on sleep – A comment to Winkler et al.



## A B S T R A C T

## Keywords:

Electroconvulsive therapy  
Sleep  
Polysomnography  
Actigraphy  
Insomnia  
Phase advance

Recent publications in this journal have suggested that successful electroconvulsive therapy (ECT) in depressed patients is associated with a phase advance, similar to what has been reported with antidepressant medications. Herein we review the effects of ECT on polysomnographic (PSG) sleep, and we conclude with the observation that ECT reliably increases PSG total sleep time and probably has a suppressive effect on rapid eye movement (REM) sleep. Remarkably, there is less information available on the topic of the effect of ECT on the patient's perception of their sleep.

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Dear Sir,

We were interested in the results of Winkler et al. (2014) showing that a course of electroconvulsive therapy (ECT) is associated with significant increases in actigraphically-measured daytime activity in depressed patients, especially those who remitted with ECT. The authors also reported a non-significant advance of the activity acrophase. These findings are important as the first finding is in-line with clinical intuition, while the second is congruent with the effects of some antidepressant medications. However, the authors went further to say that their data showed no effect of ECT on sleep, that “treatment with ECT has not been systematically investigated on its impact on sleep” [apart from their mention of Zarcone et al. (1967)], and that these “results stand in line with the clinical observation that ECT does not have a substantial influence on sleep.”

We disagree with the premise that ECT does not have known and reproducible effects on sleep, and we suspect that the authors did not have access to all of the relevant literature to laboratory polysomnographic (PSG) studies of the effect of ECT on PSG sleep in depressed patients. If we ignore the 4 published single-case reports (Green and Stajduhar, 1966; Grunhaus et al., 1985; Hawkins et al., 1967; Zarcone et al., 1967) then there are 7 case series by Van de Castle et al. ( $N = 8$ ) (Van de Castle and Hawkins, 1969), Mendels et al. ( $N = 8$ ) (Mendels et al., 1974), Hoffman et al. ( $N = 11$ ) (Hoffman et al., 1985), Linkowski et al. ( $N = 6$ ) (Linkowski et al., 1987), Coffey et al. ( $N = 11$ ) (Coffey et al., 1988), Grunhaus et al. ( $N = 10$ ) (Grunhaus et al., 1988), and Lahmeyer et al. ( $N = 6$ ) (Lahmeyer et al., 1989). All of these case series are uniformly consistent in their finding that a course of ECT increases PSG total sleep time and sleep efficiency (Total  $N = 60$ ). The effects of ECT on specific sleep stages is a little less certain, because some of these studies allowed patients to remain on rapid-eye movement

(REM)-suppressing psychotropics during ECT (Mendels et al., 1974) and because of between-study variability in how REM latency (RL) was defined. Some papers did not provide definitions of RL (Hoffman et al., 1985; Lahmeyer et al., 1989; Mendels et al., 1974; Van de Castle and Hawkins, 1969) others defined RL as the time elapsed between sleep onset (SL) and REM onset without subtracting intervening wake time (Hoffman et al., 1985; Linkowski et al., 1987) still others defined RL as the time elapsed between SL and REM onset minus intervening wake time (Coffey et al., 1988; Grunhaus et al., 1988). When only the studies that use the last definition are considered, then the overall impression is that a full course of ECT is associated with a dampening of REM phenomena, including a reduction in REM%, a prolongation of the time to RL, and a reduction in the frequency of eye movements during REM sleep (i.e., reduced REM density).

The effects of ECT on PSG sleep are noteworthy because they show the commonality between ECT and *most* antidepressant medications (i.e., both treatments suppress REM sleep), but also highlight differences between ECT and antidepressants in a way that may help explain the superiority of ECT's antidepressant effect as compared with antidepressant medications; i.e., there is rebound of REM sleep when REM-suppressing antidepressants are discontinued (Steiger and Kimura, 2010) while this has not happened for the weeks that follow ECT (Linkowski et al., 1987).

While we believe that the effects of ECT on PSG sleep is quite clear, we agree with Winkler et al. that there is more to learn about the effects of ECT on patient-reported sleep parameters. In the meantime, we congratulate the authors for their application of actigraphy in this unique clinical setting.

## Role of funding source

None.

## Contributors

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## Conflict of interest

None.

## Acknowledgments

None.

## References

- Coffey CE, McCall V, Hoelscher TJ. Effects of ECT on polysomnographic sleep: a pilot prospective study. *Convuls Ther* 1988;4:269–79.
- Green WJ, Stajduhar PP. The effect of ECT on the sleep–dream cycle in a psychotic depression. *J Nerv Ment Disord* 1966;143:123–33.
- Grunhaus L, Tiongo D, Pande A, Eiser A, Haskett RF, Greden JF, et al. Monitoring of antidepressant response to ECT with polysomnographic recordings and the dexamethasone suppression test. *Psychiatry Res* 1988;24:177–85.
- Grunhaus LTD, Roehrich H, Eiser A, Feinberg M, Greden JF. Serial monitoring of antidepressant response to electroconvulsive therapy with sleep EEG recordings and dexamethasone suppression tests. *Biol Psychiatry* 1985;20:805–8.
- Hawkins DR, Mendels J, Scott J, Bensch G, Teachey W. The psychophysiology of sleep in psychotic depression: a longitudinal study. *Psychosom Med* 1967;29:329–43.
- Hoffman G, Linkowski P, Kerkhofs M, Desmedt D, Mendlewicz J. Effects of ECT on sleep and CSF biogenic amines in affective illness. *Psychiatry Res* 1985;16(3):199–206.
- Lahmeyer Henry W, Janicak Phillip, Easton Michael, Smith Maureen, Davis John M. ECT's effect on sleep in major depression. *Sleep Res* 1989;18:346.
- Linkowski P, Mendlewicz J, Kerkhofs M, Leclercq R, Golstein J, Brasseur M, et al. 24-hour profiles of adrenocorticotropin, cortisol, and growth hormone in major depressive illness: effect of antidepressant treatment. *J Clin Endocrinol Metab* 1987;65:141–52.
- Mendels J, Van de Castle RL, Hawkins DR. Electroconvulsive therapy and sleep. In: Fink M, Kety S, McGaugh J, Williams T, editors. *Psychobiology of convulsive therapy*. New York: Wiley; 1974.
- Steiger A, Kimura M. Wake and sleep EEG provide biomarkers in depression. *J Psychiatr. Res* 2010;44:242–52.
- Van de Castle RL, Hawkins David. The effect of electroconvulsive therapy upon sleep patterns of depressed patients. *Psychophysiology* 1969;6(2):234.
- Winkler D, Pjrek E, Lanzenberger R, Baldinger P, Eitel D, Kasper S, et al. Actigraphy in patients with treatment-resistant depression undergoing electroconvulsive therapy. *J Psychiatr. Res* 2014;57:96–100.
- Zarcone V, Gulevich G, Dement W. Sleep and electroconvulsive therapy. *Arch. General Psychiatry* 1967;16:567–73.

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22 September 2014